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EXAMINER	
BARTON, JEFFREY THOMAS	
ART UNIT	**PAPER NUMBER**
1753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/799,257	NELLES ET AL.	
	Examiner	Art Unit	
	Jeffrey T. Barton	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *21-24,39 and 40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 25-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20040312*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I, claims 1-20 and 25-38 in the reply filed on 5 September 2006 is acknowledged. The traversal is on the ground(s) that no serious burden would be required to examine the nonelected claims. This is not found persuasive because the process limitations of the method claims do not carry weight in the nonelected product claims. An independent search based on different criteria would be required for the product claims, which would indeed present a serious burden.

The requirement is still deemed proper and is therefore made FINAL.

Claim Objections

2. Claims 5 and 25 objected to because it uses the British spelling of "vapour" in line 2 of each claim. The word should be changed to "vapor". The British spelling "characterised" is also used in claims 2, 6, 8-19, and 27-38. This should be changed to "characterized". Claims 16 and 35 are also objected to because the word "anhydride" is spelled as "anhydrid" in line 3 of each claim. Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 20 provides for the use of a vapor deposited oxide layer, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 20 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

6. Claims 1-19 and 25-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a limitation to "the semiconducting oxide layer", although there is no earlier recitation of a semiconducting oxide layer. The same grounds apply to claims 2 and 5-19.

Claim 3 recites "the electrode material" (line 5), "the EM layer(s)" (line 6), and "the hole transport material" (line 7), with no explicit antecedent basis for any of these terms. The word "comprising" in line 5 should be changed to "consisting" in order to comply with proper Markush format. As all general structures listed require plural "EM"s, the term "layer(s)" in line 6 should be changed to be simply "layers", assuming the lack of antecedent basis is corrected. The same grounds apply to claims 4 and 25-38

Claim 5 recites a limitation to "deposition and/or vapour deposition of an additional layer". It is unclear whether more than one step is required by this limitation. Amendment of the claim to read "deposition or vapor deposition" is suggested. In addition, it is unclear how there can be "an additional layer of lithium fluoride" when there is no earlier recited layer of lithium fluoride.

Claim 7 recites "the interfaces" and "the layers" although no interfaces or layers were recited earlier. In addition, the term "and/or" is recited in line 2 of the claim, making it unclear whether more than one of the claimed list is required.

Claims 8 and 9 recite "the substrate", although no substrate is recited in the claims. In addition, the term "comprising" in line 2 of claim 8 should be changed to "consisting of" in order to comply with proper Markush format. In addition the term "like"

in line 3 of claim 8 renders the claim indefinite, as it is not clear whether there are additional members of the group, or only those listed as examples.

Claims 10 and 11 recite "EM" with no definition of the term and no antecedent support. In addition, the term "comprising" in line 2 of claim 10 should be changed to "consisting of" in order to comply with proper Markush format. In addition the term "like Au, Al, Ca, or Mg" in line 3 of claim 10 renders the claim indefinite, as it is not clear whether there are additional members of the group, or only those listed as examples.

Claims 12 and 13 recite "HTM" with no definition of the term and no antecedent support. In addition, the term "comprising" in line 2 of claim 12 should be changed to "consisting" in order to comply with proper Markush format. In addition claim 12 recites "as typified by" in line 10 of the claim, which is unclear whether the particular compound or generic compound is required. Claim 12 also recites "such as" in line 22, which is unclear for the same reason. The claimed range in lines 31 and 32 is also unclear - is a polymer with weight of at least 1000, or at least 5000 required? These numbers should also be provided with units - it appears Daltons or g/mol is intended here.

In claim 14 at line 2, the term comprising in line 2 of claim 12 should be changed to "consisting of" in order to comply with proper Markush format. In addition, the comparative term "like" in line 2 is indefinite, as it does not explicitly denote the members of the claimed group. Deletion of the words "semiconducting oxides, like" is suggested.

Claim 16 recites "the dye" with no antecedent support. In addition, the term "comprising" in line 2 of the claim should be changed to "consisting" in order to comply with proper Markush format.

Claim 17 recites "the dye layer" with no antecedent support.

Claim 19 recites "the HTM" with no antecedent support.

Claim 25 recites a limitation to "deposition and/or vapour deposition of an additional layer". It is unclear whether more than one step is required by this limitation. Amendment of the claim to read "deposition or vapor deposition" is suggested. In addition, it is unclear how there can be "an additional layer of lithium fluoride" when there is no earlier recited layer of lithium fluoride.

In claim 26, the term "and/or" is recited in line 2 of the claim, making it unclear whether more than one of the claimed list is required.

In claim 27, the term "comprising" in line 2 should be changed to "consisting of" in order to comply with proper Markush format. In addition the term "like" in line 3 of the claim renders it indefinite, as it is not clear whether there are additional members of the group, or only those listed as examples.

In claim 29, the term "comprising" in line 2 should be changed to "consisting of" in order to comply with proper Markush format. In addition the term "like Au, Al, Ca, or Mg" in line 3 of the claim renders it indefinite, as it is not clear whether there are additional members of the group, or only those listed as examples.

In claim 31, the term "comprising" in line 2 should be changed to "consisting" in order to comply with proper Markush format. In addition claim 31 recites "as typified by"

in line 10 of the claim, which is unclear whether the particular compound or generic compound is required. The claim also recites "such as" in line 22, which is unclear for the same reason. The claimed range in lines 31 and 32 is also unclear - is a polymer with weight of at least 1000, or at least 5000 required? These numbers should also be provided with units - it appears Daltons or g/mol is intended here.

In claim 33 at line 2, the term comprising in line 2 of claim 12 should be changed to "consisting of" in order to comply with proper Markush format. In addition, the comparative term "like" in line 2 is indefinite, as it does not explicitly denote the members of the claimed group. Deletion of the words "semiconducting oxides, like" is suggested.

In claim 35, the term "comprising" in line 2 of the claim should be changed to "consisting" in order to comply with proper Markush format.

Claim 36 recites "the dye layer" with no explicit antecedent support.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 8-12, 14, 15, 18, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura.

Regarding claim 1, Nakamura discloses a method of forming a hybrid cell, comprising introducing the semiconducting oxide layer by thermal deposition. (Column 6, lines 44 - Column 7, line 57; Column 33, lines 30-64) The broad term "thermal deposition", which lacks explicit definition in the instant specification, is interpreted by the Examiner to include any deposition process that involves heating above ambient temperature. Conventional sol-gel processes for forming titanium dioxide electrodes for dye-sensitized cells is considered to meet this limitation.

Regarding claim 8, the cell is disposed on substrates as claimed. (Column 5, line 52 - Column 6, line 21).

Regarding claim 9, Nakamura discloses flexible substrates. (Column 6, lines 8-11)

Regarding claims 10 and 11, Nakamura discloses a variety of TCO materials, including ITO. (Column 5, lines 52-65)

Regarding claim 12, Nakamura discloses numerous hole transport materials, including triphenylamine derivatives. (Column 27, line 37 - Column 28, line 30; particularly column 27, line 60)

Regarding claims 14 and 15, Nakamura discloses a titanium dioxide semiconductor. (Column 33 ,line 50-64)

Regarding claim 18, Nakamura discloses using more than one dye in a cell. (Column 8, lines 10-13)

Regarding claim 19, Nakamura discloses a doped HTM. (Column 28, lines 23-30)

9. Claims 1-3, 10, 14, 15, 29, 33, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Goossens et al. (Chem. Vap. Deposition. 4(3)109-114.(1998))

Goossens et al disclose a method for producing a hybrid organic solar cell having the structure "Substrate+EM/SOL/dye/HTM/EM" as claimed, comprising vapor deposition of the SOL layer. (Experimental section, p. 114) CVD is used to deposit TiO_2 on fluorine-doped tin oxide disposed on a substrate (1st full sentence below Table 1), which is used to make a dye-sensitized cell with the claimed structure. (Page 114, 2nd column) The electrolyte solution is a hole transport material. Specific to claim 1, given the elevated substrate temperature for the titanium dioxide deposition (Page 114, 1st column - "The substrate temperature varied between 300 and 400 °C."), this process reads on "thermal deposition".

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 4, 7, 8, 11, 26, 27, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossens et al in view of Yamamoto et al.

Goossens et al teach a method as described above in addressing claims 1-3, 10, 14, 15, 29, 33, and 34.

Goossens et al do not explicitly teach vapor deposition of a second layer (Claim 4), increasing the surfaces as claimed (Claims 7, 26), any specific substrate material (Claims 8, 27), or using indium tin oxide as a TCO. (Claims 11, 30)

Yamamoto et al teach that TCOs used as front electrodes in solar cells conventionally are textured, in order to increase light scattering, and thus the path length of the light, leading to increased absorption and cell efficiency. (Column 1, line 45 - Column 2, line 15) Such texture will inherently increase the interface surface area of the materials deposited on the TCO. Furthermore they teach the conventional use of indium tin oxide as a textured TCO (Column 1, lines 45-53), and the use of glass as the substrate upon which the TCO is deposited. (Column 1, lines 25-29) They also teach vapor deposition of such transparent conducting oxides. (Column 4, line 61-67)

Regarding claim 4, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by vapor-depositing the TCO, as taught by Yamamoto et al, because Yamamoto et al teach the suitability of vapor-deposited TCO materials for use as electrodes in solar cells. (Column 4, lines 61-67) CVD is a widely used method for TCO deposition, due to its convenience and ability to coat large surface areas at relatively low cost compared to many other deposition techniques.

Regarding claims 7, 11, 26, and 30, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by using a textured indium tin oxide TCO, as taught by Yamamoto et al, because Yamamoto et al teach that the use of a textured TCO increases cell efficiency

by increasing the path length of light through the cell. A skilled artisan would have recognized that such an advantage is desirable in any class of solar cell. Furthermore, indium tin oxide is recognized in the art as essentially equivalent to fluorine-doped tin oxide in its function as a transparent conductor. The choice of either would have been obvious to one having ordinary skill in the art.

Regarding claims 8 and 27, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by specifically using a glass substrate, as taught by Yamamoto et al, because the glass is a rugged, inexpensive, light-transmissive substrate, as is well recognized in the art. Its use as a substrate for solar cells is conventional due to these advantages.

14. Claims 8, 9, 11, 12, 18, 19, 27, 28, 30, 31, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossens et al in view of Nakamura.

Goossens et al teach a method as described above in addressing claims 1-3, 10, 14, 15, 29, 33, and 34.

Goossens et al do not explicitly teach any specific substrate material (Claims 8, 27), a flexible substrate (Claims 9, 28), using indium tin oxide as a TCO (Claims 11, 30), any of the claimed HTMs (Claims 12, 31), using plural dyes in a cell (Claims 18, 37), or using a doped HTM. (Claims 19, 38)

Regarding claims 8, 9, 27, and 28, Nakamura discloses disposing dye-sensitized cells on numerous types of substrates, including flexible polymers. (Column 5, line 52 - Column 6, line 21; particularly Column 6, lines 8-11)

Regarding claims 11 and 30, Nakamura discloses a variety of TCO materials, including ITO. (Column 5, lines 52-65)

Regarding claims 12 and 31, Nakamura discloses numerous hole transport materials, including triphenylamine derivatives and polythiophenes. (Column 27, line 37 - Column 28, line 30; particularly column 27, line 60 and Column 28, lines 19-20)

Regarding claims 18 and 37, Nakamura discloses using more than one dye in a cell. (Column 8, lines 10-13)

Regarding claims 19 and 38, Nakamura discloses a doped HTM. (Column 28, lines 23-30)

Regarding claims 8, 9, 27, and 28, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by specifically using a flexible polymeric substrate, as taught by Nakamura, because Nakamura suggests that these are "competitive" (Column 6, lines 9-11), and a skilled artisan would have recognized the desirability, convenience, and marketability of flexible solar cells as being highly desirable.

Regarding claims 11 and 30, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by using indium tin oxide as the transparent conductor, as taught by Nakamura, because indium tin oxide is recognized in the art as essentially equivalent to fluorine-doped tin oxide in its function as a transparent conductor, as evidenced by Nakamura

listing them together, describing both as being suitable. (Column 5, lines 59-63) The choice of either would have been obvious to one having ordinary skill in the art.

Regarding claims 12, 19, 31, and 38, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by replacing the redox-couple electrolyte with a solid doped hole-transporting material, as taught by Nakamura, because it would reduce concerns with leaks and solvent evaporation in self-contained cells. All of the materials listed by Nakamura are known to be suitable for hole transport in this class of cells, and the selection of any would have been obvious to a skilled artisan.

Regarding claims 18 and 37, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by using more than one dye in a cell, as taught by Nakamura, because Nakamura teaches that this broadens the region of wavelength conversion, which increases cell efficiency. (Column 8, lines 10-13)

15. Claims 11-13, 17, 19, 30-32, 36, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossens et al in view of Saurer et al.

Goossens et al teach a method as described above in addressing claims 1-3, 10, 14, 15, 29, 33, and 34.

Goossens et al do not explicitly teach using indium tin oxide as a TCO (Claims 11, 30), any of the claimed HTMs (Claims 12, 13, 31, and 32) or using a doped HTM. (Claims 19, 38)

Saurer et al teach a method of making a hybrid solar cell including using an indium tin oxide electrode material (Column 3, lines 30-35; Column 4, lines 42-48; Figure 5), and using doped phthalocyanines, such as copper phthalocyanine as a hole transport material. (Column 6, lines 36-57; with an n-type titanium dioxide electrode, such material lying between the electrodes is inherently a hole-transporting material in a functional cell, and should obviously be p-type) The titanium dioxide electrode of Saurer et al is disclosed as being as thin as 100 nm. (Column 4, lines 54-56)

Regarding claims 11 and 30, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by using indium tin oxide as the transparent conductor, as taught by Saurer et al, because indium tin oxide is recognized in the art as essentially equivalent to fluorine-doped tin oxide in its function as a transparent conductor, as evidenced by Saurer et al listing them together, describing both as being suitable. (Column 3, lines 30-35; Column 4, lines 42-48) The choice of either would have been obvious to one having ordinary skill in the art.

Regarding claims 12, 13, 19, 31, 32, and 38, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by replacing the redox-couple electrolyte with a solid hole transport material, such as doped CuPc, as taught by Saurer et al, because it would reduce concerns with leaks and solvent evaporation in self-contained cells and because Saurer et al teach these materials' suitability in carrying out this function in hybrid cells.

Regarding claims 17 and 36, the Examiner's position is that the thickness of the semiconducting oxide layer is a parameter variable by a skilled artisan, depending on the desired degree of transparency, for instance, where two TCO materials are used as electrodes. The principle by which the cells function is not altered by this thickness, and the Federal Circuit has held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984). Since the dye penetrates through much of the depth of the semiconducting oxide in cells of this type, a dye layer with the claimed thickness would obviously be present in a cell with the claimed oxide layer thickness.

16. Claims 5, 6, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossens et al in view of Yu et al and either Saurer et al or Nakamura.

Goossens et al teach a method as described above in addressing claims 1-3, 10, 14, 15, 29, 33, and 34.

Goossens et al do not explicitly teach providing a layer of lithium fluoride near an electrode material, or such a layer having a thickness of 0.1 to 50 Å.

Saurer et al and Nakamura teach solid organic hole transfer materials, with both teaching use of polyphenylenevinylenes for this purpose. (Saurer et al - Column 6, lines 36-48; Nakamura et al - Column 28, lines 17-18) The obviousness of using these

materials as hole transport materials as replacements for the electrolyte of Goossens et al was argued in the preceding paragraphs.

Ye et al teach that a 1-30 nm film of LiF between a polyphenylenevinylene semiconductor layer and an aluminum counter electrode improves the short circuit current and off-state voltage of a photovoltaic device. (Column 19, lines 55-58)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Goossens et al by using a solid HTM, such as PPV, as taught by either Nakamura or Saurer et al, for the reasons given in the preceding paragraphs. It would further have been obvious to use a 1-30 nm film of LiF between the HTM and and Al counter electrode, as taught by Yu et al, because Yu et al teach that this improves the short circuit current and off-state voltage of a photovoltaic device. (Column 19, lines 55-58)

17. Claims 16 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goossens et al in view of Han et al.

Goossens et al teach a method as described above in addressing claims 1-3, 10, 14, 15, 29, 33, and 34.

Goossens et al do not explicitly teach using one of the claimed dyes.

Han et al teach the preferred use of azo-dyes, perylenes, porphines, or porphyrins, among others, as the sensitizers in hybrid cells. (Column 6, lines 34-56)

It would have been obvious to one having ordinary skill in the art to modify the method of Goossens et al by replacing his dye with an azo, perylene, porphyrin, or

porphine dye, as taught by Han et al, because Han et al teach that these dyes provide improved efficiency relative to ruthenium complex dyes. (Column 6, lines 30-38)

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
22 November 2006

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SUPERVISORY PATENT EXAMINER
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